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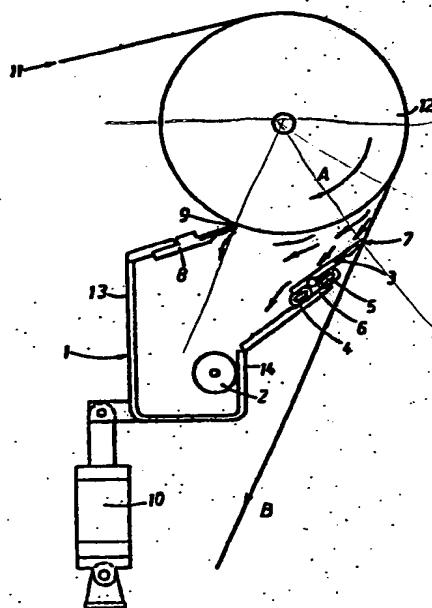
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㉓ Improvements in or relating to doctoring mechanisms.

㉔ A doctoring mechanism for removing liquid from a belt and supporting roll, and in particular a water and/or oil film from the belt and supporting roll of a paper forming machine.

In order to achieve this efficiently the doctoring mechanism is located on the outgoing side of the roll relative to belt contact, and the doctor body (1) carries two doctor blades (7,9) which are arranged to contact the roll and belt respectively to remove liquid therefrom. Furthermore the doctor body (1) serves to catch doctoring liquid and the spray generated on separation of the belt from the roll.



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DESCRIPTION

"IMPROVEMENTS IN OR RELATING TO
DOCTORING MECHANISMS"

The present invention relates to a doctoring mechanism for removing liquid carried by a moving belt and supporting roll.

The doctoring mechanism has a particular application in removing a water or oil film from the belt and supporting roll of a paper forming machine.

When a wet moving belt contacts a supporting roll on its wetted surface, the liquid is sprayed out from the outgoing side of the roll where the belt parts contact with the roll. The film of liquid, originally adhering only to the belt, on contact with the roll, is trapped between the belt and the roll and adheres to both roll and belt for the duration of their contact. When the belt separates from the roll the liquid film splits; part of it adheres to the belt, another part adheres to the roll and a third part emerges as a spray in the form of droplets.

An aim of the present invention is to remove that part of the liquid carried by the belt surface, and a further aim is to remove that part of the liquid carried on the roll surface. A still further aim is to catch and remove the spray produced on separation of the belt from the roll.

According to the present invention there is provided a doctoring mechanism for removing liquid from a belt and supporting roll, the mechanism comprising a doctor body disposed on the outgoing side of the belt and carrying a roll doctor blade arranged to contact the supporting roll surface and a doctor blade arranged to contact the belt to remove liquid respectively from the roll and belt, and spray catchment means formed by the doctor body.

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The doctor body comprises an elongate channel member, preferably U-shaped or the like, with the roll doctor blade and belt doctor blade carried by a respective limb of the channel member. Water removed from the roll and belt by the doctor blades is directed into the channel formed by the doctor body from where the collected liquid is conveyed away by drainage passages to a reservoir.

It is difficult to remove oil or other liquids from a belt because of the lack of rigidity of belts in general. When the belt surface is corrugated it is impossible to remove oil uniformly across the width of the belt. By disposing the doctor mechanism on the outgoing side of the belt part of the oil or liquid is removed from a solid roll (which is relatively easy to doctor), part is collected in the form of a spray and only a small part has to be removed from the belt. The belt doctor blade is placed in a position very close to the point where the belt is fully supported by the roll, and therefore presents a straight surface which is easy to doctor.

The doctor blades may be either of rigid construction or may be pivotably mounted. Where the or each blade is pivotably mounted gravity loading or air tube loading may be employed.

In one embodiment the doctor body is mounted for pivotal movement controlled by an actuator. The actuator may be a pneumatic cylinder.

The present invention will now be described further, by way of example only, with reference to the accompanying drawings, in which:

Fig. 1 is a simplified end view of one embodiment of a doctoring mechanism in accordance with the invention;

Fig. 2 is a simplified view illustrating an

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application for the doctoring mechanism according to the present invention;

Fig. 3 is a simplified end view of another embodiment of doctoring mechanism, employing a different 5 doctor blade, and

Fig. 4 is a simplified end view of yet another embodiment of doctoring mechanism employing another alternative doctor blade.

Referring to Fig. 1 there is shown a belt 11 partially entrained round the surface of a belt support roll 12. The arrows A and B indicate respectively the direction of rotation of the roll 12 and the direction of travel of the belt 11. A doctoring mechanism is positioned on the outgoing side of the roll to belt contact. The doctoring mechanism comprises 10 a doctor body 1 which is mounted for pivotal movement about an axis 2. A pneumatic piston/cylinder 10 or any other convenient actuator is provided to adjust the pivotal position of the doctor body. The doctor body 1 comprises a longitudinal channel section member, 15 generally U-shaped, with one limb 13 slightly longer than the other limb 14. The channel member serves as a trap and drainage channel for liquid removed from the roll and belt by the doctoring mechanism. The 20 liquid is conveyed to a reservoir by passages (not illustrated).

Each limb 13, 14 carries a doctor blade which is secured thereto by means of a blade holder. The limb 13 carries the roll doctor blade 9 and its holder 8, whilst the limb 14 carries the belt doctor blade 7 and its holder 3.

The doctor blade 9 is pressed against the belt support roll 12 by means of the pneumatic piston/ 30 cylinder 10 whereafter the belt 11 can be introduced to its position on the support roll 12. A rigid blade

holder is employed in the embodiment. The belt doctor blade 7 can now be individually pressed against the belt 11. To achieve this in the illustrated embodiment, the blade holder 3 is mounted for pivotal movement about an axis 6 and flexible air tubes 4 and 5 are provided for controlling movement of the blade holder. By introducing air into the air load tube 4 and venting to atmosphere the air unload tube 5, the blade is pivoted clockwise in the illustration into contact with the belt 11. Reversing the connections to the tubes 4 and 5 causes the blade 7 to be moved in the anti-clockwise direction.

With the doctor blades pressed against the roll and belt, liquid adhered to either of these surfaces is removed and conveyed away to reservoir by way of the doctor body. Spray is also generated where the belt separates from the roll and this is collected by the doctor body and likewise conveyed away.

Fig. 2 illustrates one application for the doctoring mechanism of the present invention on an extended nip press in order to remove oil from the extended nip press belt. Parts corresponding to those illustrated in Fig. 1 are identified by identical reference numerals. In an extended nip press, oil is introduced between a shoe 15 and the belt 11 in order to create a film of oil which withstands the pressure of the shoe 15 against a press roll 16. Whilst steps are taken to remove oil from the belt after the shoe, some oil remains on the belt. At high speeds an oil spray is generated after the belt contacts a supporting roll and this is objectionable as it mixes with the air and is carried away by it in the form of a mist. By placing the doctoring mechanism on the first belt support roll, this spray is collected inside the doctor and oil is removed from the roll and belt, thus

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ensuring that the belt is dry from there on.

If necessary a further doctoring mechanism can be employed on the next supporting roll and any subsequent rolls.

5 Figs. 3 and 4 show various alternative arrangements for supporting the two doctor blades. Corresponding parts are identified using identical reference numerals to those employed in the description of Fig. 1.

10 The drawings of Figs. 1, 3 and 4 all show the roll doctor blade 9 having a rigid mounting, i.e. rigid blade holder; however, this may be replaced by a pivotal holder of the air loading type as employed for the belt doctor blade 7 of Fig. 1 or of the gravity loaded type as employed for the belt doctor blade of 15 Fig. 4 and described further hereinbelow.

Fig. 3 shows an embodiment in which both the roll doctor blade 9 and the belt doctor blade 7 employ rigid blade holders 8, 8'. The pivotal movement of the doctor body 1 about axis 2 together with, where necessary, adjustable mounting for the blade holders 8, 8', ensures that the doctor blades pass against the roll and belt.

25 Fig. 4 illustrates a gravity loaded belt doctor. The doctor blade 16 is carried by a holder 17 which is pivotally mounted about an axis 18. The axis is set to one end of the holder 17 so that the weight of the holder causes it to pivot in a clockwise direction and thereby presses the doctor blade 16 into contact with the belt in the illustrated example. With appropriate modification the gravity loaded arrangement can be employed for the roll doctor blade also, i.e. by arranging for the holder to pivot in an anti-clockwise direction under the influence of gravitational forces.

30 Any convenient combination of doctor blade mounting

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arrangements may be employed in the application
described with reference to Fig. 2.

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CLAIMS

1. A doctoring mechanism for removing liquid from a belt and supporting roll, characterised in that the mechanism comprises a doctor body (1) disposed on the outgoing side of the roll to belt contact, a roll doctor blade (9) carried by the doctor body and arranged to contact the supporting roll surface to remove liquid therefrom, and a belt doctor blade (7) also carried by the doctor body and arranged to contact the belt to remove liquid therefrom, and in that the doctor body serves as spray catchment means.
5. 2. A doctoring mechanism as claimed in claim 1 in which the doctor body (1) comprises an elongate channel member with the roll doctor blade (9) and belt doctor blade (7) carried by a respective limb (13, 14) of the channel member.
10. 3. A doctoring mechanism as claimed in claim 1 or 2 in which either or both of the doctor blades (7, 9) are fixedly secured to the doctor body.
15. 4. A doctoring mechanism as claimed in claim 1 or 2 in which either or both of the doctor blades (7, 9) are movably mounted on the doctor body.
20. 5. A doctoring mechanism as claimed in claim 4 in which the blade or blades are pivotally movable.
25. 6. A doctoring mechanism as claimed in claim 5 in which adjustment means is provided for the blade and comprises two flexible tubes (4) and (5) which act on either side of a pivot axis (6) and which are subjectable to fluid pressure to control pivotal movement of the blade.
30. 7. A doctoring mechanism as claimed in claim 4 or 5 in which the doctor blade is applied to the surface from which it is to remove liquid by gravity loading.

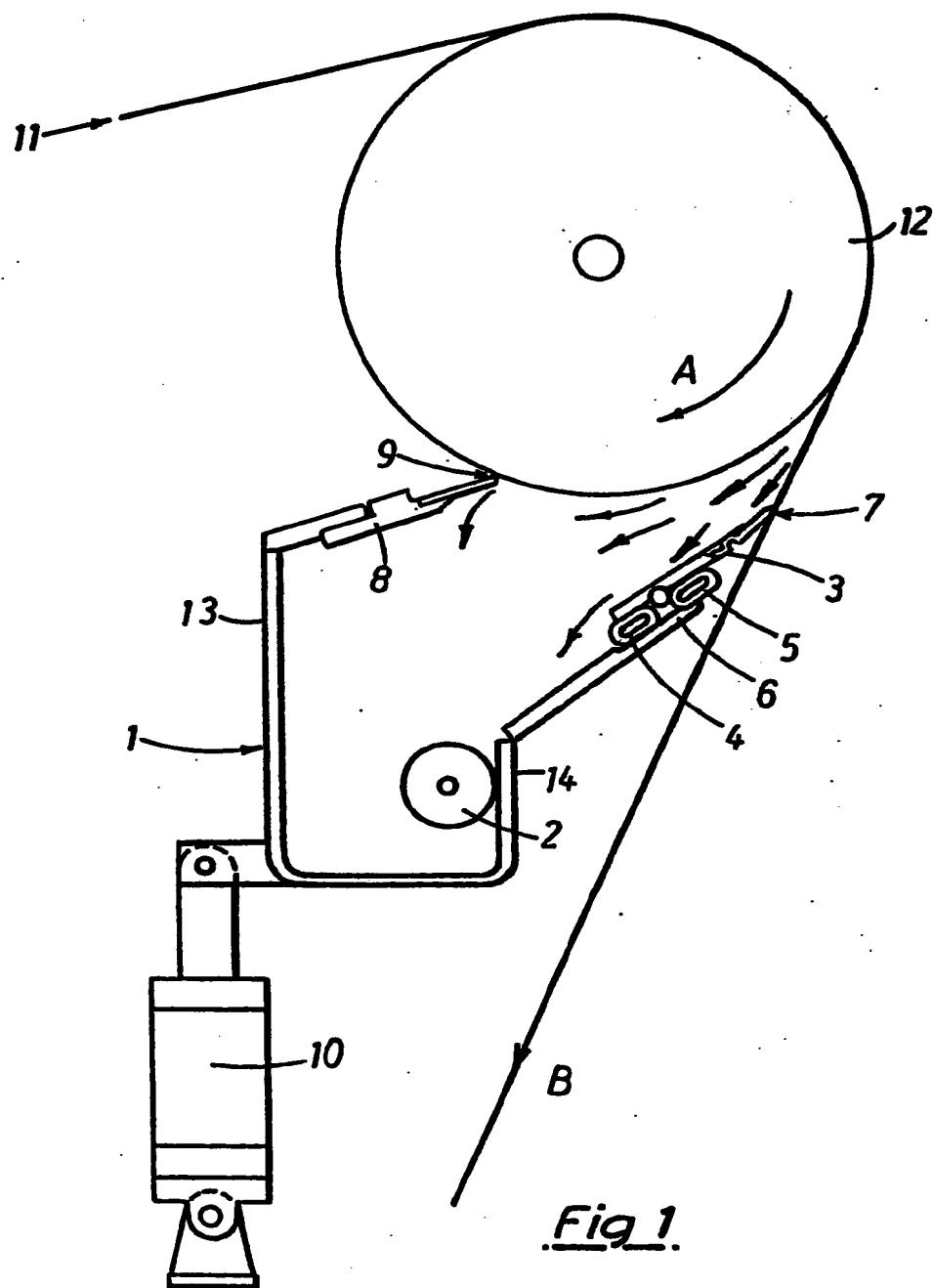
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8. A doctoring mechanism as claimed in claim 7 when appendant to claim 5 in which the doctor blade is mounted in a holder (17) which is pivotally mounted on the doctor body.
 - 5 9. A doctoring mechanism as claimed in any preceding claim in which the doctor body (1) is mounted for pivotal movement with respect to the roll.
 10. A doctoring mechanism as claimed in claim 9 in which an actuator (10) controls the pivotal movement of the doctor body.
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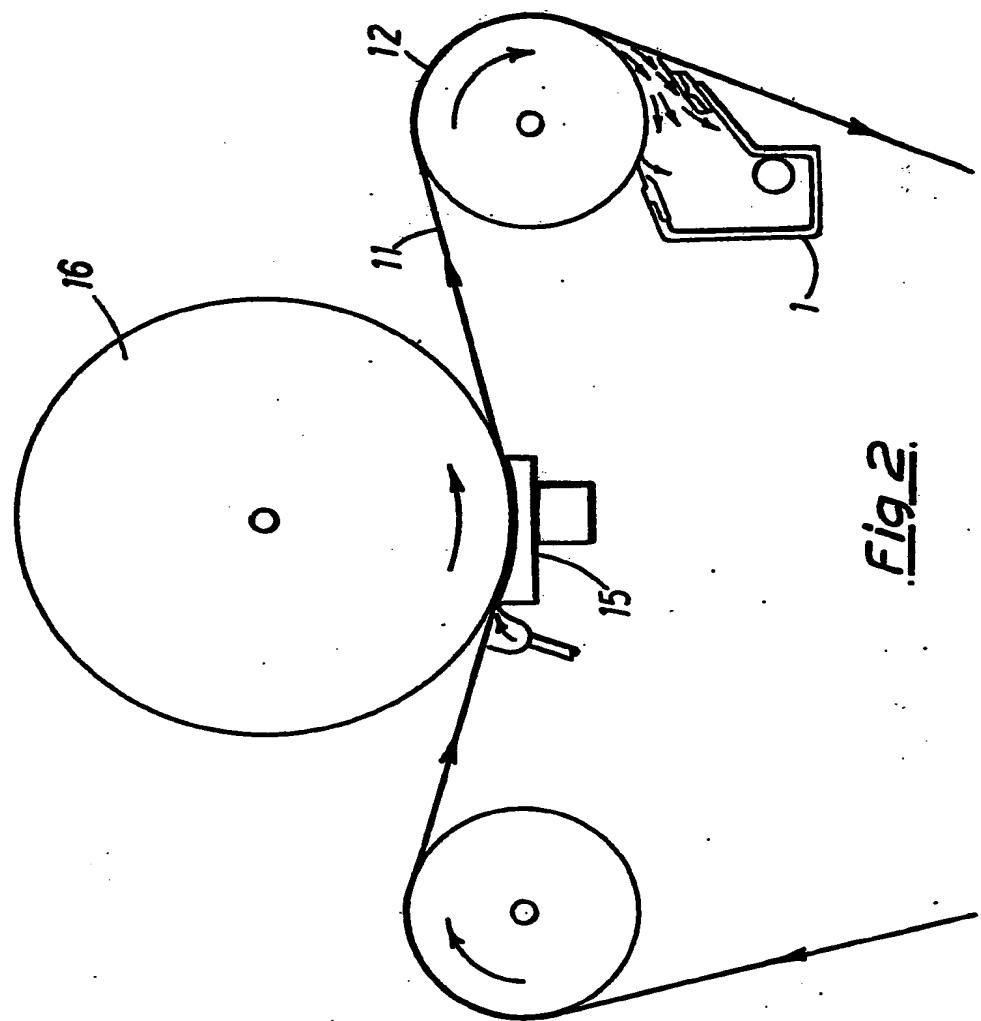


Fig 2

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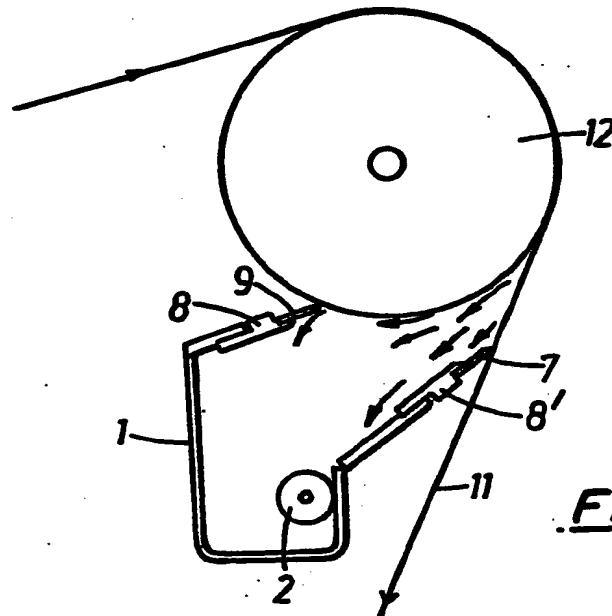


Fig. 3.

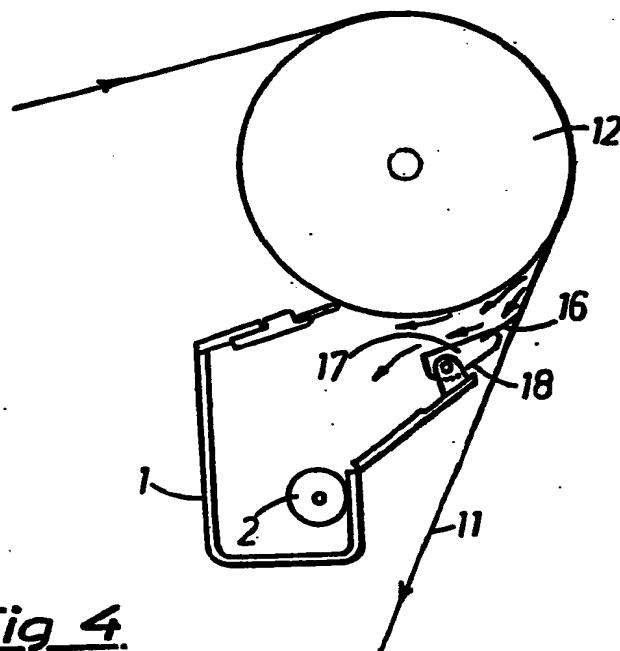


Fig. 4.